



## INFORMATION REPORT

OPNAV FORM 8800-8(c) (CHIPS)

CLASSIFICATION	FROM	REPORT NO.	DATE
CONFIDENTIAL	COMNAVGER APO 742	1139-54	19 Oct 54

By filling the spark chamber with  $\text{CO}_2$  or  $\text{N}_2$ , the duration of light flashes can be reduced to less than  $0.5 \cdot 10^{-6}$  sec. The affected shortness of duration, however, is accompanied by a reduction in intensity.

The pulse projector lamp shown on enclosure (1) was mounted on a stand in such a manner that it could be turned in all directions. Both a pulse keying and charging apparatus and a control device were arranged below the lamp. The main power supply input is only 300 watts. If desired, the pulse projector can be delivered in a water-tight form so that it can be used for under-water tests.

The charging and control device charges an impulsing condenser battery which (together with the spark chamber and a mirror) is incorporated into the pulse projector. The spark chamber is decomposable. It consists of a base plate, a tombac bellow (tombac is a copper base zinc alloy), a quartz cylinder, a plexiglass cap, and silicone packings. The electrodes are made of sintered tungsten. The quartz cylinder offers the advantage of being capable of emitting U V radiation so that, by adding inertia-less fluorescing materials, special photographic effects can be achieved in hydromechanical experiments.

The impulsing condenser battery is composed of three styroflex di condensers. The brightness of the flashes can be modified by changing the filling pressure. The electrode distance can be adjusted by means of an adjusting screw. The pulse keying and charging device operates in the periodic pulse range of 0 - 20,000 light-flashes per minute. In addition, it allows for both the release of single flashes through either a shutter or a built-in pressure knob, and separate control through a contact breaker. A relay is incorporated for automatic blocking during the various operations.

The employed control device is a pulse generator of the firm "DRELLO" (see COMNAVGER IR 948-54 dtd 8 Sep 54) working in the ranges: 400 - 8,000 pulses/min. and 700 - 18,000 pulses/min.

Accessories delivered by the firm Dr. Ing. FRUENGEL are the pulse retarding instruments Retarder I and Retarder II. Both instruments are used to insert an adjustable time interval between either a releasing pulse and a light flash, or one light-flash and another (Retarder I: 1 -  $120 \cdot 10^{-6}$  sec; Retarder II: 100 -  $2500 \cdot 10^{-6}$  sec).

-2- Special Handling Required; Not Releasable to Foreign Nationals.

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INFORMATION REPORT  
AFM FORM 8090-2 (C) (CHIPS)

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Prices (approximately):

Light flash lamp	2,000 DM
Pulse keying and charging device	3,400 DM
Control device "DRELLO"	1,400 DM
Additional pulse condenser	1,400 DM
Retarder I and II	3,200 DM

2. LIGHT FLASH STROBOSKOP LS-911. The VEB MESSGERÄTEWERK ZWÖLFBITZ - VEB RFT (DDR) developed the light flash stroboscope LS-911 shown on enclosure (2). The equipment includes the instrument producing the relaxation oscillations and a mercury high pressure lamp serving as the light source. The apparatus incorporates an oscillatory circuit which, over a transmitter, excites the main circuit (supplying the power to the lamp) in the same rhythm. The relaxation oscillatory frequency (and with it the number of light flashes) is controlled in coarse stages by connecting and disconnecting condensers. Fine adjustment is effected by changing the grid bias voltage. The number of light flashes is measured by a special relaxation circuit and indicated directly by a moving coil measuring device. The reading error is  $\pm 2\%$  of the terminal scale value. Technical data of the instrument are:

a. Light flash range:

6 - 800 light flashes/sec., adjustable in six coarse stages; fine regulation within each stage.

b. Duration of one light flash: about  $10^{-5}$  sec.

c. Light intensity of a light flash: 50,000 Hefner units (providing a spontaneous increase for photography).

d. Power supply:

Main supply voltage: 220 volt/40-60 c/s.  
Power input: about 300 VA.

e. Tubes:

1 high pressure lamp HJE 50 W

-3- Special Handling Required; Not  
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INFORMATION REPORT  
OPNAV FORM 8030-2(G) (CNP-6)

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1 tube type S 0,8/2 i III  
2 tube type S 1/0,2 i II A  
2 tube type RQ 7,5/0,6  
1 tube type STV 280/40  
1 tube type EW 3-9 V/2A

f. Dimensions: 550 x 250 x 320 mm

g. Weight: about 30 kg

3. SPARK FLASH DEVICE FA-902: In addition, the VEB MESSGERAETEWERK ZWONITZ - VVB NE RFT has developed the spark flash device FA-902 shown on enclosure (3). The main spark gap is supplied the required voltages by a condenser battery which is charged by the main power supply over a high voltage unit. A special unit controls and feeds an auxiliary spark gap (lying in the main spark gap) used to realize both the unambiguous ignition conditions and the release of the main spark (light flash). The auxiliary spark gap is controlled through pulses by both controlling ix transmitters and thyratrons. The spark flash is released either by opening or closing a contact which can be connected to the apparatus from the outside, or by feeding a "foreign pulse" to specially marked sockets.

Some technical data of the equipment are as follows:

a. Half value period of the light flash:

about  $1.5 \times 10^{-6}$  s.

b. Maximum light flash intensity:

about  $1.5 \times 10^{-6}$  Hefner units.

c. Time of delay from pulse transmission to maximum intensity:

about  $2 \times 10^{-6}$  s.

d. Power supply:

Main power supply: 110/125/220 V/50 c/s.

Power input: about 90 VA.

-4- Special Handling Required; Not  
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CMR FORM 2820-2(C) (CMPC)

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## e. Tubes:

1 tube type S 1/0.2 i II A  
2 tubes type EZ 12  
1 tube type RRC 5

f. Dimensions: 220 x 285 x 425 mm.

g. Weight: about 15 kg.

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-5- Special Handling Required; Not  
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OPNAV FORM 2520-2(A) (CHRS)

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Preparing Officer's Comment: I. The "Superstreboskop" is capable of delivering light flashes of extreme brightness (40 megawatts) and short duration (a few millieths of second). This accommodates good photography even of fast processes (speeds up to 100 m/sec).

II. During World War II, Dr. Frank FRUENGEL built high-quality measuring instruments for German aeronautical research laboratories. He is considered to be an expert in this field.

III. The spark flash intensity achieved by the spark flash equipment FA-902 is much lower than that of the "Super-Streboskop". However, it can still be used for testing purposes.

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